

DFMETEO: meteorological data detection module for **Domino** bus

DFMETEO module allows the detection of several meteorological data. The module interfaces, on one side, to the **Domino** bus and, on the other side, to a special sensor through a dedicated communication line.

DFMETEO module reports the value of three parameters:

- x temperature
- x daylight
- x wind speed

DFMETEO module provides 9 digital points to inform about the following conditions:

- x Rain
- x Twilight
- x Temperature \geq Threshold
- x Daylight \geq Threshold
- x Wind speed \geq Threshold
- x Light from South
- x Light from West
- x Light from East
- x Sensor failure

The module features a 2-way fixed terminal block for the connection to **Domino** bus and a 3-way fixed terminal block for the connection, through lines A and B, to the meteorological sensor.

Near to the bus terminal block, a small push-button allows the address programming and a green LED shows when the module is ready to receive the address itself; the same LED normally flashes every 2 seconds about to signal that the module is properly operating. A red LED near to the 3-way terminal block signals the communication presence on the lines A and B. Under the cover of the bus terminal block, a small 3-way connector (PRG) allows the connection to the optional tester/programmer.

DFMETEO module is housed in a DIN 3M modular box for rail mounting.

Address programming

DFMETEO module takes, inside the **Domino** bus, 4 consecutive input addresses and, if enabled by the configuration panel of BDTools, 3 consecutive output addresses. However, only a unique base address has to be assigned to the module to make it operating; assigning an address n, it will take the input address from n to n+3 and the output address from n to n+2 (if enabled). For the details about the address programming refer to the related documentation. A white label on the front panel allows to write the base address for an immediate visual identification.

Wiring diagram

The schematic diagram in the figure 1 shows the connections to be made between DFMETEO module and **Domino** bus and the meteorological station (terminals A and B). The meteorological station must be supplied by 24Vdc voltage.



The meteorological station has a 5-way removable terminal block with a premounted diode for reverse polarity protection; however, pay attention to the connection of the meteorological station because, in the opposite case, it could be irreversibly damaged. The connections must be executed before to apply the power supply.

For the connection of the meteorological station use a cable with 2 twisted pairs, with proper section (for instance 2x2x0,8mmq); use a pair for the power supply and the other pair for the communication line (A e B). If the chosen cable provides the shield, connect it to the terminal 3 (G) of DFMETEO module, leaving it unconnected on the side of meteorological station. The maximum allowed length for this cable is 100 meters.

Information reported on the bus

Input section:

As said above, DFMETEO takes, inside **Domino** bus, 4 input addresses; said n the assigned base address, the information mapped on the input section are:

Point	n	n+1	n+2	n+3
1				Rain
2				Twilight
3				Temp. \geq Th..
4				Daylight \geq Th.
5			Wind speed value	Wind \geq Th.
6	Temperature value in tenth of °K (Kelvin degrees multiplied by 10)	Daylight value in tens of LUX (LUX divided by 10)	in tenth of meters per second (m/s multiplied by 10)	Light fr. South
7				Light fr. West
8				Light fr. East
9				-
10				-
11				-
12				-
13				-
14				-
15				Sensor failure
16				-

DFMETEO

In details, the input addresses n, n+1 and n+2 respectively report:

- x measurement of the temperature in °K multiplied by 10; called X the value reported the address n, to convert it to °C use the formula $(X-2730)/10$. The temperature in BDTools will be instead directly displayed in °C
- x measurement of the daylight value in tenth of lux; called Y the value reported by the address n+1, to convert it to lux value multiply Y by 10. the daylight in BDTools is directly displayed in lux (0 to 99000 lux)
- x measurement of the wind speed in m/s multiplied by 10 (0.0m/s to 70.0m/s). The wind speed in BDTools will be instead directly displayed in m/s.

The address n+3 reports some digital points that, when activated, signals the presence of the following conditions:

- x Rain
- x Twilight
- x Temperature ≥ Threshold
- x Daylight ≥ Threshold
- x Wind speed ≥ Threshold
- x Light from South
- x Light from West
- x Light from East
- x Sensor failure

The points related to the light direction will be enabled only if the daylight is greater than 20000 lux. The digital point related to the rain status will be disabled, from when this meteorological condition is no more true, with a delay of 6 min-

utes about. The digital point related to the twilight status is activated when the daylight is lower than 15 lux and deactivated in the opposite case.

Output section:

The module can feature, as said above, 3 output addresses for setting the thresholds via bus; these addresses have to be enabled, if required, by the DFMETEO configuration panel, as described in the following. Said n the assigned base address, the information mapped on the output section are the following:

Punto	n	n+1	n+2
1			
2			
3			
4			
5			
6			
7			
8	Set the temperature threshold in tenths of Kelvin degrees	Set the daylight threshold in tens of lux (LUX divided by 10)	Set the wind speed threshold in tenth of meters per second (m/s divided by 10)
9			
10			
11			
12			
13			
14			
15			
16			

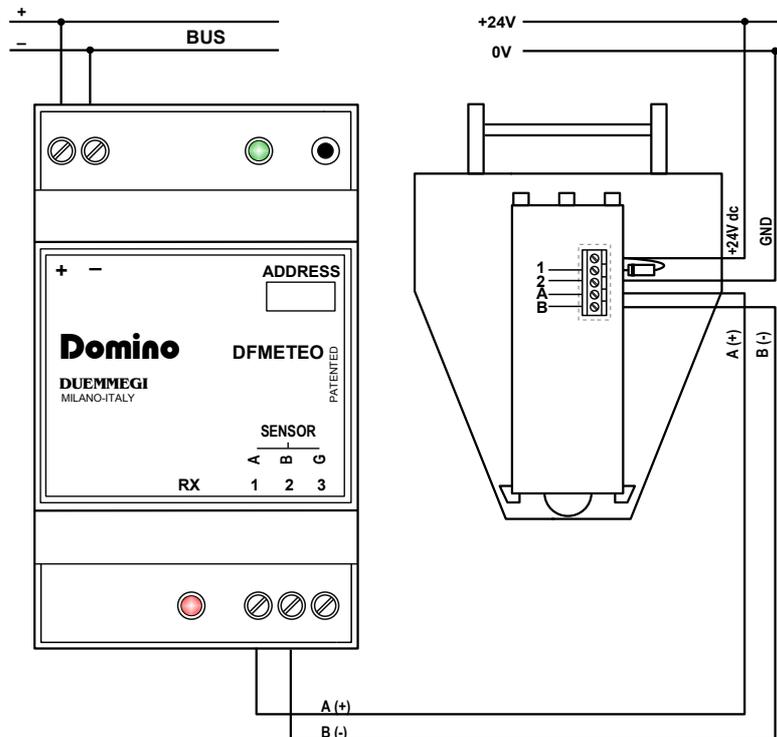


Figure 1: Wiring diagram

In details, the output addresses n, n+1 and n+2 respectively report:

- x Temperature threshold in °K multiplied by 10; called X the desired value in °C, to convert it to °K multiplied by 10 use the formula $(X+273) \times 10$. The threshold in BDTools will be instead directly set in °C.
- x Daylight threshold in LUX divided by 10; called Y the desired value, the value to be written at the output address n+1 is Y divided by 10. The threshold in BDTools will be instead directly set in LUX.
- x Wind speed threshold in m/s multiplied by 10; called K the desired value, the value to be written at the output address n+2 is K multiplied by 10. The threshold in BDTools will be instead directly set in m/s.

Masking times and thresholds

As will be described in the following, the configuration panel of DFMETEO (inside the BDTools) allows to set the masking times (or delay times) and the desired threshold values.

The masking times can be applied to the following measurements:

- x Daylight
- x Wind speed

These masking times are used to delay the deactivation of the bits of input address n+3 related to the just listed measurements. The switching from 0 to 1 is instead instantaneous in respect to the overcoming of the related threshold.

The thresholds can be set by the configuration panel or by the output address as described in the previous paragraph, and they apply to the following meteorological measurements:

- x Temperature
- x Daylight
- x Wind speed

Setting a value for each of these measurements, a threshold will be set on the activation of the related bits of address n+3.

Installation of the meteorological station

Position

Choose an installation position in the building where wind, rain and sun can be easily measured from any direction by the sensors. The meteorological station must not be installed underneath any structural parts from which water can still drip onto the rain sensor after it has stopped raining or snowing. The meteorological station must be oriented toward the SUD direction and it must not be shaded by anything, such as building structures or trees. At least 60 cm of free space underneath the meteorological station are mandatory to allow it to measure the wind correctly and to avoid malfunctions caused by the snow.

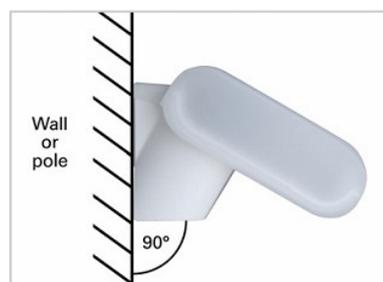
View inside the sensor



1. Connector for the wires of the rain sensor
2. Connector for the wiring of:
 - x 1: +24Vdc
 - x 2: GND
 - x A: Communication line +
 - x B: Communication line -
3. Not used
4. Not used

Mounting

The meteorological station must be mounted onto a vertical wall or pole.



The meteorological station must be mounted horizontally in the lateral direction.

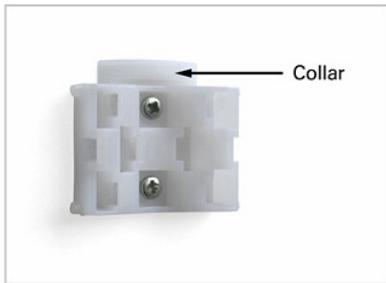


Positioning the support for meteorological station

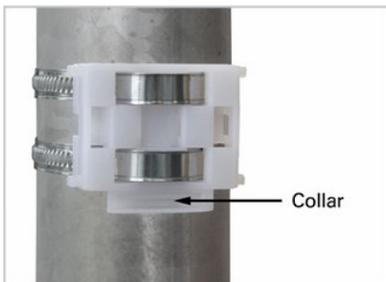
The meteorological station comes with a combination wall/pole mount. Mount the support vertically on the wall or on the pole as described in the following.

DFMETEO

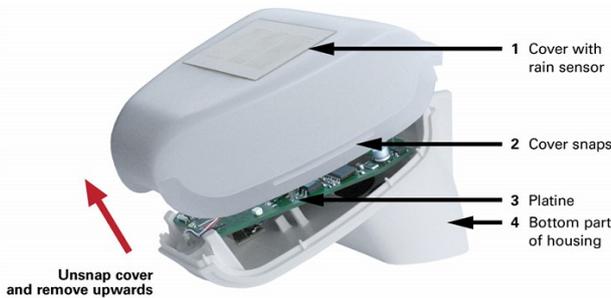
Wall mounting: flat surface on wall, collar upward lock on with screws (not provided).



Pole mounting: curved side on pole, collar downward; lock on with metallic fasteners (not provided).



Preparing the meteorological station

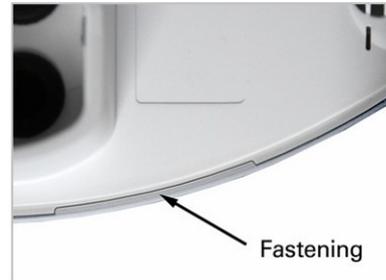


The meteorological station cover with the rain sensor snaps in on the left and right along the bottom edge. Remove the meteorological station cover. Proceed carefully, so as not to pull off the wire connecting the PCB in the bottom part with the rain sensor in the cover (wire with push-connector). Push the connection cable through the rubber seal on the bottom of the meteorological station and connect the power and communication cables to their related terminals. The connection is by typical telephone cable (J-Y(ST)Y 2 × 2 × 0.8).

Mounting the meteorological station

Close the housing by putting the cover back over the bottom part. The cover must snap in on the left and right with a definite click.

Make sure the cover and bottom part are properly snapped together. The following figure shows the meteorological station closed in correct way (bottom view).



Push the meteorological station from above into the fastened mount. The bumps on the mount must snap into the rails in the housing.



To remove it, the meteorological station can be simply pulled upwards out of the mount, against the resistance of the fastening.

Notes on installation

Do not open the meteorological station if water (rain) could get in: even a few drops could damage the electronics inside. When mounting, take care not to damage the temperature sensor (small PCB on the bottom of the housing). Also, the wire connecting the PCB with the rain sensor must not be pulled off or kinked at the terminal.

Note: it will take 30 seconds after applying the power before the wind measurement will be output.

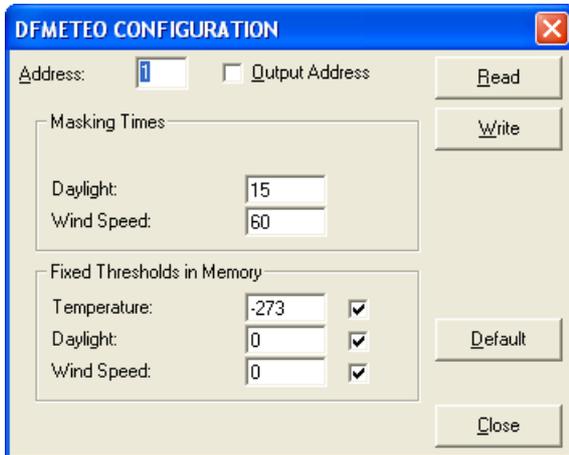
Maintenance

The meteorological station must be checked for dirt on a regular, twice-yearly basis and cleaned if necessary. A dirty meteorological station can lead to strange results, such as the wind sensor failing to work, the station constantly announcing rain, or failure to detect sunlight.

DFMETEO

DFMETEO configuration panel

The configuration panel, available in BDTools, allows to set DFMETEO module. The details will be described in the following. Through the main menu of BDTools selected Programming and after DFMETEO Configuration; the following windows will be shown:



Address: it is the address of DFMETEO module to be configured or to be read.

Output Address: enabling these parameter, the output addresses of DFMETEO will be activated (the value of the base output address will be the same assigned to the input section).

Read: this option allows to read the current configuration of the selected DFMETEO module.

Write: this option allows to write, into the memory of the module, the desired values for the masking times and the thresholds.

Default: this option restores the default values in the configuration panel; these ones are:

- x Address: 1
- x Output address: disabled
- x Masking times:
 - o Daylight: 15sec
 - o Wind speed: 60sec
- x Fixed thresholds in memory:
 - o Temperature: -273
 - o Daylight: 0
 - o Wind speed: 0

Close: quit the configuration panel.

Masking times

Daylight: entering a value in this field, a delay in seconds will be introduced before the deactivation of the digital point related to Daylight >= Threshold.

Wind speed: entering a value in this field, a delay in seconds will be introduced before the deactivation of the digital point related to Wind Speed >= Threshold.

Note: no masking time is featured for the deactivation of the digital point related to Temperature >= Threshold, because a 1 °C hysteresis is already provided.

Fixed thresholds stored in memory

Temperature: setting the threshold value to -273°C, the comparison will be disabled and the related digital points will be always '0'. Setting a different value, a threshold will be fixed for the digital point related to the temperature.

Daylight: setting this parameter to '0', the digital point related to daylight measurement will not have any threshold. Setting a value greater than '0', a threshold will be fixed for the related digital point.

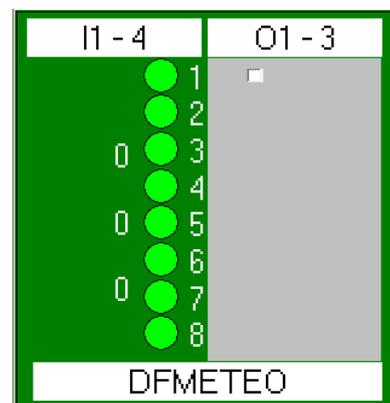
Wind speed: setting this parameter to '0', the digital point related to the wind speed will not have any threshold. Setting a value greater than '0', a threshold will be fixed for the related digital point.

The check box near to the threshold value will enable (if checked) the comparison with the related values, otherwise the comparison will be executed with the value sent via bus through the output address.

N.B.: by default the thresholds values shown in the configuration panel are all enabled. If these fixed thresholds in memory are used, the changing of the threshold values through the output address of DFMETEO will not take any effect and the thresholds will not be modified. To use the thresholds sent via bus, disable the related check boxes.

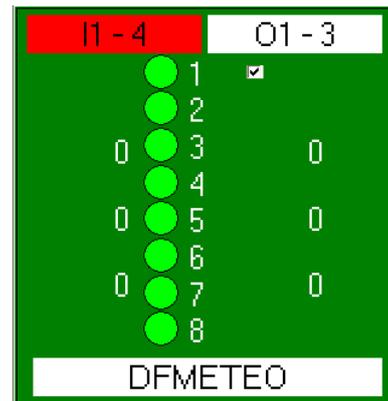
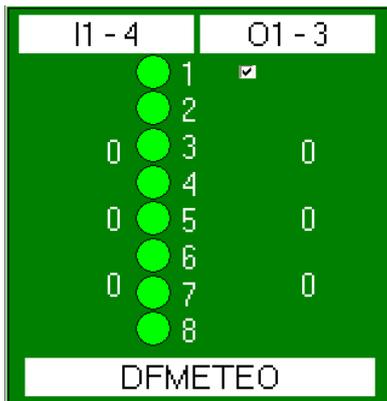
Mapping

BDTools allows to display the map of DFMETEO module as in the following figure.

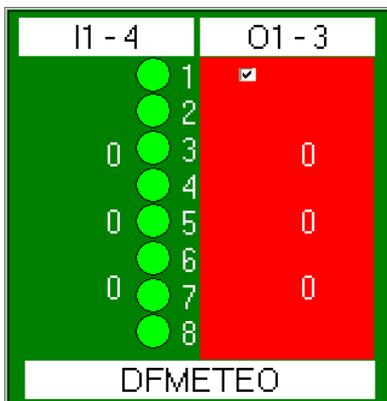


By default, the output section is shown in gray color, because it is supposed to be disabled; if instead the output address has been enabled, tick off the check box on the top right side. In this case the module will be shown as in the following figure:

DFMETEO



If instead the check box is ticked off but the output section of the module is disabled, then the module will be shown as in the following figure:



Note: The failure sensor condition will be activated with a delay of 10 seconds; this delay time is fixed and cannot be modified.

Technical characteristics

DFMETEO module supply voltage	By specific centralized power supply mod. DFPW2
Meteo station supply voltage	24V \pm 15%
DFMETEO current consumption	Equal to 4 standard modules
Meteo station current consumption	100mA MAX
Temperature range	-30 \div +50 °C
Daylight range	0 \div 99000 lux
Wind speed range	0 \div 70 m/s
DFMETEO module operating temperature	-10 \div +50 °C
Meteo station operating temperature	-30 \div +50 °C
Storage temperature (DFMETEO + sensor)	-30 \div +85 °C
Protection degree of module DFMETEO	IP20
Protection degree of sensor	IP44

Temperature: this is the temperature value measured by the meteorological station (°C) (first value on the top left side).

Daylight: this is the daylight value measured by the meteorological station (Lux) (second value on the top left side).

Wind speed: this is the wind speed value measured by the meteorological station (m/s) (value on the lowest left side).

Temperature Threshold: this is the current threshold sent via bus (°C) (first value on the top right side).

Brightness Threshold: this is the current threshold sent via bus (Lux) (second value on the top right side).

Wind Speed Threshold: this is the current threshold sent via bus (m/s) (last value on the bottom right side).

Digital points:

- x Rain
- x Twilight
- x Temperature \geq Threshold
- x Daylight \geq Threshold
- x Wind speed \geq Threshold
- x Light (Sun) from South
- x Light (Sun) from West
- x Light (Sun) from East

In case of **Sensor Failure** condition, the background of the address field of the input section will be shown in red color as in the following figure:

Outline dimensions

